



Case Study

Our Achievements

- ➔ Biometric Solution Provider (BSP) and Biometric Subject Matter Expert (BSME) for India's UID project
1.2 Billion Residents
- ➔ The world's first large scale unique citizen ID database for Andhra Pradesh PDS project
90 Million Residents
- ➔ The world's first multi-biometric citizen ID project for United Nations World Food Programme (UNWFP) in Orissa
1 Million Residents
- ➔ The world's fastest de-duplication project for AP ration cards
6.2 Quadrillion matches in a record time of 60 days
- ➔ The world's largest corporate ID system for one of India's leading petrochemical conglomerate
430,000 Employees
- ➔ India's second largest enrolment agency for Aadhaar project
12 Million Residents

World's fastest De Duplication for removal of duplicate and nonexistent beneficiaries from the Food Entitlements program of Government of Andhra Pradesh

Background

The Government of Andhra Pradesh used Iris based biometric technology for identification of unique citizen for issue of ration cards to beneficiaries of Food entitlements Scheme or public distribution system (PDS). The ration cards were issued in the year 2005-06, 2006-07, 2007-08 using Designated Photography Locations (DPL) in a distributed model. The Iris based ration card were issued throughout the state of Andhra Pradesh using around 1800 DPLs. The iris of the citizen was captured along with the family photo and other social details.

As the database size increased, the technology and solution provided could not scale up and was not able to detect duplicate enrollments. Realizing the limitations in the solution, bogus/shadow enrollments (in the name of non existing households) were generated without restraint. Although there are still uncovered eligible households, enrollments were stopped and this resulted in many genuine eligible beneficiaries getting excluded from the food entitlements programme. The situation has come to a stage where the database reflected a population of 86 Million while the State's population is only 83 Million.

Category	Explanation	Households (in Millions)
1. BPL cards	Below Poverty Line	21.006
White cards	BPL families	19.355
AAY	Destitutes > 65 years	1.5578
Annapurna	Poorest of Poor	0.0932
2. APL or Pink Cards	Above Poverty Line	2.714
Total Cards	BPL + APL	23.72

The discrepancies in Ration card data got extended to other welfare schemes like Pensions, Housing, Arogyasri (Health Insurance) etc., as these schemes are linked to Below Poverty Line (BPL) cards. All this has resulted in huge monetary impact on the exchequer. Realizing the huge loss to the state's exchequer, and with the aim to eliminate bogus and fraudulent beneficiaries and also to include the excluded genuine beneficiaries, a global tender was invited for de-duplication of the Iris Ration Card Data.

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As part of the tender evaluation process, 3 million Iris records were given to the bidder for de-duplication and the bidders were assessed with respect to the time taken and accuracy of the de-duplication process. 4G Identity Solutions was the only bidder that was technically qualified and was awarded the project as the competitors has taken more than 3 times the time taken to complete the de-duplication and achieved less than 30% accuracy of what 4Gid has achieved in identifying the duplicates.

Scope

4Gid implemented the world's fastest Iris De-duplication project for the Government of Andhra Pradesh. The project consolidated and De-duplicated the Ration Card database of 82 million citizens with Iris codes of 56 million citizens. 4Gid performed over 6.26 quadrillion (6,262,668,889,152,840) Iris matches to remove duplicate enrolments. In addition, 4Gid employed demographic match software to filter duplicate enrollments in records where no Irises were enrolled. The results of the De-duplication have generated about 30 million survey sheets that are used by Government officials for verifying households in the state.

The main objective of this exercise was to weed out duplicate/ bogus Ration Cards estimated at about 2 million in the state. The Government saves close to \$200 million every year on rice subsidy alone by weeding out bogus/ duplicate Ration Cards.



Existence and Eligibility Field Survey of the duplicates identified after the de-duplication process

The scope of the de-duplication project involves:

- ➔ Aggregation of Iris biometric and Demographic data available in different formats of CDs, DVDs and Hard disks that was lying in different parts of the state
- ➔ Assessment of quality of biometric data for acceptance and rejection before uploading of data to server
- ➔ Design of database and sizing for carrying out de-duplication
- ➔ Iris based de-duplication (NxN Matching) of 56 Million beneficiaries Iris data
- ➔ 86 Millions Demographic de-duplication

Solutions

Government

- >> National ID Solutions
- >> Election ID Solutions
- >> Public Service Delivery Infrastructure
- >> Public Distribution System
- >> NREGA
- >> Pensions

Enterprise ID

- >> Recruitment
- >> Time and Attendance
- >> Access Control
- >> Visitor management

Banking & Financial

- >> Authentication
- >> Micro ATM
- >> Biometric ATM
- >> Financial Inclusion
- >> Bank on Wheels

E.National Access Mgmt

- >> Immigration
- >> eVisa
- >> ePassport

Law Enforcement

- >> AFIS
- >> ABIS
- >> Live scan
- >> Mobile ID
- >> ID management for Prisons
- >> ID management for Courts

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Services

- >> Enrollment Services
- >> De-Duplication Services
- >> Authentication Services
- >> Consulting Services
- >> Data Management Services

Suites

- >> Corporate ID
- >> Recruitment ID
- >> Health ID
- >> Education ID
- >> Airport ID

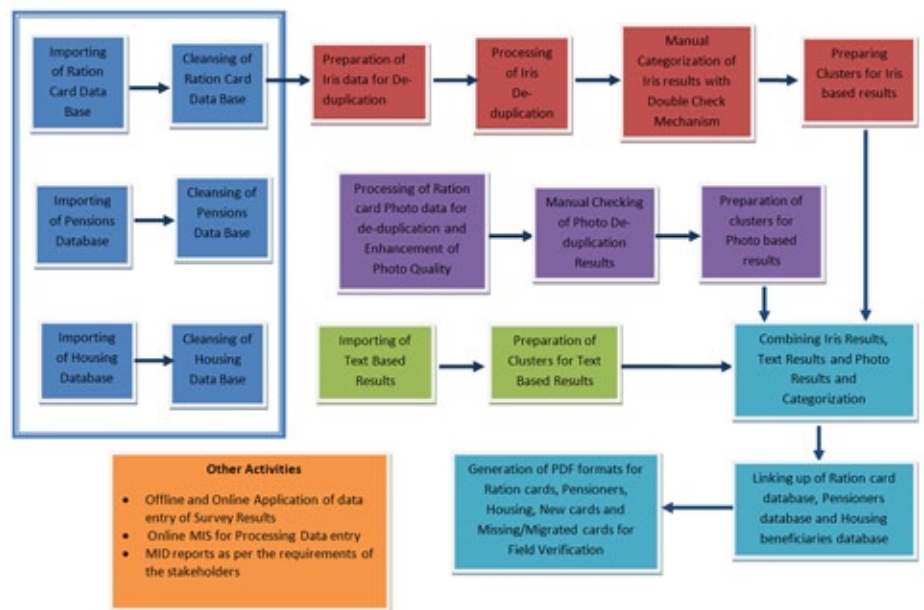
Products

- >> 4G Multi Modal ID Platform
- >> eAccess
- >> Enrollment Devices
- >> Authentication Devices
- >> Smart Cards

- ➔ Linking of Food Entitlements database with pension and housing beneficiaries databases
- ➔ Clusterization of de-duplication results for effective Field Verification
- ➔ Printing of softcopies of de-duplication results for effective field verification of duplicates
- ➔ Training the officials and master trainer for conduct of effective field survey
- ➔ Online field verification monitoring and review system
- ➔ After field verification, building up clean and centralized unique ID database
- ➔ Data migration from De-duplication server to Production Server for 1:N Identification

Project Lifecycle

PROJECT PLAN FOR DEDUPLICATION PROJECT



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Analysis of Duplicates provided in the de-duplication

The duplicates that were detected after the Iris based de-duplication were divided into the following categories. This was done for the purpose of effective field verification to avoid manipulation at field level

Type I – Iris Match, Same Photo

No.	Source Card Details	Source Photo	Match Photo	Match Card Details
1	WAP022806400005 Total Members : 3 Head: Appalaswamy Dukka Address: 7-44, Gollaveedhi, Gajularega, Gajularega			YAP0228067A0275 Total Members : 3 Head: Dalnaidu Chowdavada Address: 2-1, Ralla veedhi, Ralla veedhi, Gajularega
2	WAP022806400098 Total Members : 4 Head: Appalaraju Chukka Address: 7/58, Sai colony, Sai Colony, Gajularega			WAP022806400100 Total Members : 4 Head: Gowri Galagana Address: 8-165A, Gollaveedhi, Gollaveedhi, Gajularega

Analysis

- ➔ Operator administered fraud
- ➔ Bogus cards are generated for non-existent family by copying the photo & Iris of genuine beneficiaries. This would have been done by tampering the enrollment software
- ➔ High probability of collusion by the operator/service provider

Type II– Iris Match, Manipulated Photos

2	WAP022806400112 Total Members : 2 Head: Appalaraju Chukka Address: 7/58, Sai colony, Sai Colony, Gajularega			YAP0228067A0275 Total Members : 3 Head: Dalnaidu Chowdavada Address: 2-1, Ralla veedhi, Ralla veedhi, Gajularega
3	WAP022806400113 Total Members : 2 Head: Appalaraju Chukka Address: 7/58, Sai colony, Sai Colony, Gajularega			YAP0228067A0275 Total Members : 3 Head: Dalnaidu Chowdavada Address: 2-1, Ralla veedhi, Ralla veedhi, Gajularega

Analysis

- ➔ A clear case of bogus/shadow card generated by keeping arbitrary photograph.
- ➔ This would have been done by tampering the enrolment software. High probability of collusion by the operator / service provider

Type III– Iris Match, Same Citizen, Duplicate Card

No.	Source Card Details	Source Photo	Match Photo	Match Card Details
1	WAP022806700009 Total Members : 4 No. of Iris Matches : 2 Head: Pydraru Setty Address: 7-168, SAI COLONY, SAI COLONY, Gajularega			WAP0221021A0039 Total Members : 4 Head: Pandraru Setty Address: 7-168, SAI COLONY, SAI COLONY, Gajularega
2	WAP022806700197 Total Members : 4 No. of Iris Matches : 1 Head: Narsi Reddy Katti Address: 15-104, Srinagar Colony, Srinagar colony, Gajularega			PAP0261011B0240 Total Members : 4 Head: Narsi Reddy Katti Address: 4-B-132, SHANTHI NAGAR, SHANTHI NAGAR, Ward-4

Analysis

- ➔ Case of citizens coming more than once for enrollment for availing benefits multiple times.
- ➔ It is likely that these citizens would have gone to other DPL centers to get an extra card.

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4Gid team with officials of UIDAI



4Gid team with Ranjna Sadashiv Sonawane, the first recipient of Aadhaar and his five year old son Hitesh the second recipient of Aadhaar during the national launch

Type IV– Iris Match within the Family

No.	Source Card Details	Source Photo	Match Photo	Match Card Details
1	WAP022806800005 Total Members : 7 No. of Iris Matches : 1 Head: Ramarao Gedela Address: 1-74, Pedda veedhi, Pedda veedhi, Dharmapur			WAP022806800005 Total Members : 7 Head: Ramarao Gedela Address: 1-74, Pedda veedhi, Pedda veedhi, Dharmapur
2	WAP022806800026 Total Members : 3 No. of Iris Matches : 1 Head: Sanyasamma Mokka Address: 0-, Peddaveedhi, Peddaveedhi, Dharmapur			WAP022806800026 Total Members : 3 Head: Sanyasamma Mokka Address: 0-, Peddaveedhi, Peddaveedhi, Dharmapur

Analysis

- ➔ Case of matching of Iris of one person with another person with in the same family and this is mainly done by operator so that enrolment process gets over fast

Type V – Iris Match, Two Different Cards

No.	Source Card Details	Source Photo	Match Photo	Match Card Details
1	WAP022807000014 Total Members : 5 No. of Iris Matches : 1 Head: Rajara Kulkukuri Address: 0-, Yatapeta, Yatapeta, Kukalametta Lakshmpura			WAP022807000013 Total Members : 3 Head: Chinnthali Koditla Address: 0-, Konda veedhi, Konda veedhi, Kukalametta Lakshmpura
2	WAP022807000036 Total Members : 3 No. of Iris Matches : 1 Head: Kondamma Gottimakkala Address: 1-225, Rajala colony, Rajala colony, Kukalametta Lakshmpura			PAP022806900465 Total Members : 6 Head: Sanyasarayanchari Patolu Address: 3-44, Jarumu, AnandaParam Colony, Jarumu Narayanapuram

Analysis

- ➔ Case of Iris matching, but photos are different.
- ➔ This would have done by copying Iris from one card and photo from another card to create a bogus card or for speedy enrolment process

Learning's from the Project

- ➔ Biometric enrolment process is one of most important critical factors of any large scale biometric identification projects. The enrolment process needs to be standardized and enrolment needs to be done by well trained operators and it is recommended to have standard certification process for the enrolment operators. The enrolment client needs to be designed in a fool proof manner so that any kind of manipulations by operator is not made possible.
- ➔ Safe and Secure transfer of data: It is very important to ensure the safe and secure transfer of data from the time it is captured till it reaches the de-duplication process and also storage of the data after de-duplication. There should not be any possibility to manipulate the data during the enrolment process and during data transfer through encryption of data in the client and decryption only at the central server.

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- De-duplication is the heart of any biometric identification exercise that ensures one id for one person and avoids multiple registrations by one individual. De-duplication process needs to be completed as quickly as possible from the time of enrolment. The more the latency between enrolment process and de-duplication processes, the more chance of manipulation of data.
- The credentials or Identity cards needs to be provided in a centralized manner and should only be provided after the de-duplication process is completed.
- Selection of the right partner with extensive experience in handling large Identity Management projects who shares the vision, mission and mandate of the Customer.

Impact

Governments

- Hundreds of millions of dollars leakages in the form of duplicate and shadow beneficiaries plugged resulting in significant savings for the Government
- More than 18% duplicate, deceased and nonexistent beneficiaries identified and removed from the database.
- Benefits extended to excluded beneficiaries and trust on Government Service Delivery established

Industry

- Proved applicability of Biometric Technology to large scale civil ID programmes
- Proved scalability of Iris Recognition Technology to Millions of subjects
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- The project and iris recognition technology was seen as failure earlier to the de-duplication project. By delivering the de-duplication 56 million residents database in record 2 months time, it was realized that the project management was failure and not the technology. The project proved the reliability of the Iris recognition technology and is seen as the most accurate technology.

About Us

4G Identity Solutions Private Limited (4Gid) is a Pioneer (since 2001) & Global leader in providing large scale Identity Management Solutions using biometrics. 4Gid specializes as an End-to-End Identity Management Solutions provider & System Integrator in Civil ID, Homeland Security & Law Enforcement for Government, Corporate, Banking and Defence sectors.

4Gid has re-defined ID Management business space by providing thought leadership and proof of concepts that led to the world's largest ID programmes. 4Gid has executed many of the world's first large scale Identity Management Solutions for federal governments, multilateral agencies and top notch Corporates, and is currently delivering the world's biggest Civil ID Project – India's Unique ID / Aadhaar.